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Network Control Center Data System (NCCDS) Network and Systems Management (NSM) Implementation Plan

Volume 1
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National Aeronautics and Space Administration

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Greenbelt, Maryland

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1. Background

1.1 Introduction

This document establishes and describes the procedures for implementation of the Network Control Center (NCC) Data System (NCCDS) Network and Systems Management (NSM) subsystem for the NCC 1998 (NCC98) Project. The procedures for the installation of the NSM are designed to optimize the functionality available to the NCC staff throughout the implementation phases and minimize disruption of NCCDS services. The NSM staff will present specific functionality in two phases, the first phase being Initial Operating Capability (IOC) and the second Final Operating Capability (FOC). Two phases of implementation support the testing requirements of the NCC98 Project and allow for a smooth transition into operation.

The NCC98 project is a major redesign of the original NCCDS subsystems and infrastructure that will not only modernize the NCCDS by complying with the Open Systems Interconnect (OSI) standards but improve the over all NCCDS services provided by using the latest technology. The original NCCDS subsystems and infrastructure consisted of five major subsystems and six, four in the NCC98 design, LAN segments. As part of the improvements to the NCCDS, the NCC98 engineers devised a central management system that will monitor and manage specific NCCDS subsystems. [For a description of these subsystems, reference the NCCDS NSM Architecture Document (AD)] The NCCDS subsystem designed to act as the central management system is the NSM. The NSM will provide an automated means for monitoring and managing the specific components of the NCCDS.

1.2 Implementation Phases

The NSM staff proposes a two-phased approach to integrate, customize, and transition the NSM subsystem into operation at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC) NCC. IOC will provide the NCC with all functionality required to assist in Build One Testing of the NCCDS, and FOC will provide all functionality and documentation necessary to operate and maintain the NSM. Both Phases will also provide training and testing of each NSM component as they become available after installation. NSM training will consist of informal instruction on the operation and administration of each function provided by the NSM subsystem.

NSM IOC functionality will be delivered at month six (6), October 31, 1996, and consist of baseline installations of hardware and software tools necessary to support Build One Testing of the NCCDS. At the conclusion of NSM IOC, the NCC operators will comprehend the full capabilities of the available functionality and be able to utilize the functionality. The NSM Administrator will have working knowledge of all functions required to manage the NSM.

NSM FOC functionality will be delivered at month thirteen (13), 1 June, 1997, and consist of Commercial-Off-The-Shelf (COTS) Tool installations and customizations. At NSM FOC, all NSM functional requirements will have been met and full knowledge of NSM operations, systems and network reporting, and trouble ticket functionality will be available to the NCC operators. Table 1-2 illustrates the NSM tools and projected implementation schedule.

Table 1-2 NSM Implementation Schedule

COTS Tool	Duration (weeks)	Phase
HP IT/Operations Center (IT/O)	11	IOC
HP OmniBack II	1	IOC
Oracle	1	FOC
Remedy ARS	8	FOC
Spider	8	FOC
Netscape	2	FOC
HP NetMetrix	6	FOC
BGS Best/1 Performance	5	FOC

The risk in meeting the implementation delivery dates is exceptionally low because of the integration and customization experience with each of the recommended tools. As new versions of the NSM recommended tools become available during the development and implementation effort, each will be evaluated to determine the applicability, impact to the NSM baseline, and justifiable functionality for incorporation into the NCCDS NSM subsystem.

1.3 NSM Training

User knowledge and understanding of a new system is important to smooth transition and system turnover. Training will commence at the completion of the first COTS Tool installation and will conclude at the completion of FOC. The implementation of training will be divided into two tasks; documentation and informal training sessions. The NSM staff will produce an NSM Administrators Guide (NAG) and an NSM Training Plan (NTP) for the NCC Operators, as well as vendor supplied documentation for both hardware and software components purchased. The specific tasks required to produce these elements are described in sections two and three of this document.

2. NSM Initial Operating Capability (IOC)

2.1 Introduction

The NCCDS NSM subsystem will be implemented in two phases. The first phase, IOC, encompasses several tasks:

1. Procurement of all NSM hardware components and COTS Tools,
2. Installation and configuration of all NSM hardware components,
3. Installation and customization of specific COTS Tools
   (HP IT/O and OmniBack II only).

The NSM hardware procurement and delivery will take approximately eight (8) weeks. While waiting for the hardware to arrive, the NSM staff will utilize an existing Hewlett Packard (HP) 9000 K-Class server to install and customize arriving COTS tools. Doing so will produce an NSM prototype which will facilitate COTS Tool configuration, testing, and troubleshooting. After the hardware arrives, the NSM software may be easily tranferred to its host platform due to the testing and troubleshooting performed on the NSM prototype.

2.2 NSM Hardware Components

The NCCDS NSM subsystem hardware components consists of an HP 9000 J-210 Workstation with 512 Megabyte (MB) of memory, two internal disk drives, and two internal removable media drives. The other components of the NSM are four HP 9000 C-100 Workstations with 128 MB of memory, one internal removable media drive which will be used for a CD-ROM and two internal disk drive slots. Both models of workstations are delivered with a 20” color graphics monitor with standard keyboard and mouse. All five workstations will run the current version of the HP-UX Operating System and come packaged with two run-time user licenses and the necessary vendor documentation. The J-Class workstation will be referenced as the NSM server and the C-Class workstations as the Client Consoles for the duration of this document.

The procurement and implementation of the hardware components, operating system, and licenses will be broken down into a smaller set of tasks which will also be broken down into sub-tasks. Table 2-2 depicts these tasks and sub-tasks.

Table 2-2 Hardware Implementation Tasks

Task Number	Task Description	Duration (days)
1	Coordinate procurement of NSM hardware and software components with NCC staff	10
2	Obtain hardware and software components	45 - 60
3	NSM Server Installation	1
3.1	Connect all components of the workstation (i.e., monitor, keyboard, and mouse)	
3.2	Connect DDS2 DAT tape drive	
3.3	Connect CD-ROM	
4	Client Console Installations	2
4.1	Connect all components of the workstations (i.e., monitor, keyboard, and mouse)	
4.2	Connect CD-ROM	
5	Operating System and License Installation	5
5.1	Verify HP-UX Operating System exists on the NSM Server	
5.2	Verify HP-UX Operating System exists on the Client Consoles	
6	Configure NSM Server for networking	1
6.1	Configure IP address and netmask	
6.2	Set up DNS, YP, networks, and services	
7	Configure Client Consoles for networking	2
7.1	Configure IP address and netmask	
7.2	Set up DNS, YP, networks, and services	

2.3 NSM IOC Software Tools

The software tools to be installed during NSM IOC will include only those software tools necessary to coordinate Build One Testing of the NCC98 Project. Each COTS Tool will represent one task and the steps in customizing the tool will represent a sub-task. For a description of each COTS Tool and its functionality, reference the *NCCDS NSM AD*. Table 2-3 depicts these tasks and sub-tasks.

Table 2-3 NSM IOC COTS Tool Implementation Tasks

Task Number	Task Description	Duration (days)
8	IT/O Installation on NSM Server	20
8.1	Configure IT/O to receive traps	
8.2	Map SNMP IDs to device IDs	
8.3	Configure DNS, networks, services	
8.4	Develop or obtain the host file	
8.5	Build the seed file for auto-discovery	
9	IT/O Agent Installation on Client Consoles	15
9.1	Configure SNMP agent community strings	
9.2	Configure SNMP agents to forward traps	
10	Test all IT/O components	1
11	Commence training of IT/O	1
12	OmniBack II Installation on NSM Server	10
12.1	Configure OmniBack II for system-wide backups	
13	OmniBack II Agent Installation on Client Consoles	5
14	Test all OmniBack II components	1
15	Commence training of OmniBack II	1

3. NSM Final Operating Capability (FOC)

3.1 Introduction

The FOC phase of the NSM subsystem implementation pertains to several COTS Tool installations and major NSM system customizations. The customizations entail system resource allocations and COTS tool refinement in order to provide maximum NSM functionality. The COTS Tools being installled during this phase include the following:

1. Remedy ARS,
2. Oracle,
3. Spider,
4. Netscape,
5. HP NetMetrix, and
6. BGS Best/1.

3.2 NSM FOC Implementation Tasks

The COTS tools to be installed are those that were not installed in NSM IOC and were not necessary for Build One Testing of the NCCDS. Although these COTS tools do not apply to IOC, they are crucial for delivery of the NSM subsystem and NCCDS Build Two Testing. The FOC COTS tools provide trouble ticketing, databases, fault detection, and configuration management and are required to meet the functional requirements of the NCCDS. Each COTS tool listed in Section 3.1 of this document represents a task and the steps needed to install and customize the tool will be referred to as sub-tasks. For a description of each COTS tool and its functionality, reference the *NCCDS NSM AD*. Table 3-2 lists each task and sub-task.

Table 3-2 NSM FOC COTS Tool Implementation Tasks

Task Number	Task Description	Duration (days)
16	Remedy ARS Installation on NSM Server	30
16.1	Configure ARS to use flatfile and RDBMS	
16.2	Develop customized Trouble Ticket schemas for different event categories	
16.3	Develop customized Trouble Ticket interface for different event categories	

Table 3-2 NSM FOC COTS Tool Implementation Tasks, cont.

Task Number	Task Description	Duration (days)
16.4	Integrate ARS with IT/O for automatic and manual Trouble Ticket generation	
16.5	Define NCC Operations groups and responsibility centers to receive notification and Trouble Tickets	
16.6	Configure ARS for auto-notifications and escalation of trouble ticket to supervisor or an alternate point-of-contact	
17	Remedy ARS Client Installation on Client Consoles	20
17.1	Customize Trouble Ticket software on clients	
18	Test all ARS components	1
19	Commence training of ARS	1
20	Install Oracle on NSM Server	5
20.1	Configure databases	
20.2	Set up database triggers for system restarts	
21	Test all Oracle components	1
22	Commence training of Oracle	1
23	Install Netscape Server on NSM Server	2
24	Install Netscape Browser on Client Consoles	3
25	Install Spider on NSM Server	35
25.1	Integrate Spider, Netscape, and Oracle for Web-to-Database connection	
25.2	Create SQL forms in WWW-browser format for easy access using the Web-to-Database interface tool to update NCC Configuration Files	
26	Test all Web-to-Database components	1
27	Commence training of Web-to-Database applications	1
28	Install NetMetrix on NSM Server	20
28.1	Configure NetMetrix to poll devices	
28.2	Configure the Internetwork Monitor module	
28.3	Configure the Internetwork Response Manager module	
28.4	Configure the Load Monitor module	
28.5	Configure the Protocol Analyzer module	
28.6	Configure the NFS Monitor module	
28.7	Configure the Traffic Generator module	
28.8	Configure the Reporting module	
29	Install NetMetrix Agents on managed devices	10
29.1	Configure NetMetrix Agents to send information	

Table 3-2 NSM FOC COTS Tool Implementation Tasks, cont.

Task Number	Task Description	Duration (days)
30	Test all NetMetrix modules	1
31	Commence training of NetMetrix Modules	1
32	Install Best/1 Performance on NSM Server	15
32.1	Configure Best/1-Monitor	
32.2	Configure Best/1-Vizualizer	
32.3	Configure Best/1-Predict	
33	Install Best/1-Configurable Agents on managed devices	10
33.1	Customize Best/1-Configurable Agents	
34	Test all Best/1 modules	1
35	Commence training of Best/1 Modules	1
36	After COTS Tool installations are complete, run system diagnostics to analyze memory utilization, disk partition correction, and overall resource allocation.	1
37	Customize each COTS tool after diagnostics are complete (Customizations are based on results of diagnostics. Customizations may not be required if successful diagnostics have been concluded.)	1
38	Create user groups and templates	1
39	Create and modify user accounts	2
40	Document NSM Subsystem components	5
41	Write NSM System Administration Guide	5
42	Write NSM Training Plan	20

Abbreviations and Acronyms

AD	Architecture Document
COTS	Commercial-Off-The-Shelf
FOC	Final Operating Capability
GSFC	Goddard Space Flight Center
HP	Hewlett Packard
IOC	Initial Operating Capability
IT	Information Technology
IT/O	IT/Operation Center
MB	Megabyte
NAG	NSM Administrator's Guide
NASA	National Aeronautics and Space Administration
NCC	Network Control Center
NCC98	NCC 1998
NCCDS	NCC Data System
NSM	Network and Systems Management
NTP	NSM Training Plan
OSI	Open Systems Interconnect